OS Final (BAIRD)

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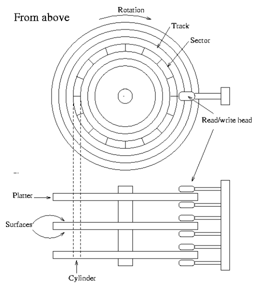
What does RAID stand for?

(R)edundant (A)rray of (I)ndependant (D)isks

3 different types of RAID

RAID 0 stripping
RAID 1 mirror (duplicates)
RAID 2 weird
RAID 3,4,6 use parity across disks
RAID 5 strips with parity bits across all drives

Physical make up of disk drives.



What is interleaving?

when the sector numbers are offset

what is cylinder skew?

when the 0th sector is offset from track to track

what is head skew?

when the read/write heads are offset from each other to reduce head switch time

What sector of a disk contains the MBR?

sector 0

What is the MBR?

Master Boot Record

What does DMA stand for?

Direct Memory Access.

Explain how DMA works.

CPU programs the DMA controller so it knows how to transfer data.
The DMA controller writes from it's buffer

What are some cons of DMA?

CPU is faster, it costs more due to needing extra hardware (DMA controller)

What is an example of Device independence?

RAID Controller. Any controller really.

What is in the MBR?

partition table and bootcode

Draw and example of the MBR

partition table partitions | /|MBR|||| | | |

what are the pros and cons of small disk blocks?

Pro: good for utilization of disk space
con: bad for performance

What two methods are used to track free space on a disk drive?

Linked-list, and bitmap

Explain the how the linked-list keeps track of free disk space.

Each block holding as many free disk block numbers as will fit (free blocks are used to hold the free-list)

Explain how the bitmap keeps track of free disk space

a disk with n blocks requires a bitmap with n bits (1 to 1 bits to block ratio)

What are some advantages of Bitmaps over linked lists when it comes to tracking free space on disks?

1) requires less space.
2) can keep just one block in memory only going to disk when the block becomes full or empty
3) disk blocks will be close together minimizing disk-arm motion
4) because bitmap is fixed size the bitmap can be placed in virtual memory and have pages paged in as needed.

What is a journaling file system?

a file system that groups operations into transactions and puts them into a journal so that in the event of a crash the system can check the journal to see if jobs need to be finished.

What are some examples of journaling filesystems?

ext3, ext 4

Explain the evolution of linux from MULTICS

1) MULTICS was created at BELL labs2) BELL labs pulled out and Ken Thompson created a stripped-down MULTICS called UNICS later becomming UNIX3) Unix was rewritten in C by Ken Thompson and Dennis Ritche4) Steve johnson implemented the portable C compiler5) 4BSD was made which implemented networking with TCP/IP6) During the development of MINIX, Linux was created by Linus Torvalds to be a full blown system with more features than MINIX

What is the main goal of Linux?

having the "principle of least surprise"

Explain the difference of fork() and clone()

clone() - doesnt distinguish between thread and process. Can created threads without creating a new processes. uses a PID in the parameters to determine what process to create thread in.
fork() - creates a copy of a process and goes its separate ways from the original process (creates a new process)

What are the advantages of virtualization?

-Cost (saves money on energy)-Gives the ability to run legacy systems and programs-Allows testing for multiple OSs on one machine-sandboxing and device independance -simple back ups, recovery, and replication

What are the difference between type 1 and type 2 hypervisors?

Type 1 run on the bare metal under the OS.
Type 2 run on top of the OS and make use of all the services and abstractions of the underlying OS

What is striping?

distributing data over multiple drives (RAID level 0)

What is the GPT?

GUID partition table

What is an OS?

"The OS is what runs in kernel mode."
"The OS turns the ugly into beautiful"

What are the generations of OSs?

1) No os2) Batch systems3) multi-programming4) GUI and networking

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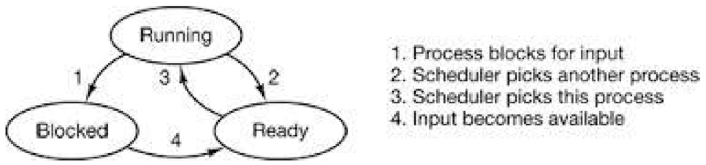
What are the two main functions of an OS?

Resource management, make things look pretty.

What are the four conditions for deadlock to occur?

Mutual ExclusionHold and waitNo PreemptionCircular Wait

Draw the process states


Running
1
3
2
Blocked
4
Ready
1. Process blocks for input
2. Scheduler picks another process
3. Scheduler picks this process
4. Input becomes available